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THE BRYOLOGIST

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# CONTRIBUTIONS TO ANTARCTIC BRYOLOGY

H. N. DIXON

## MOSSES OF DECEPTION ISLAND

Deception Island is a rarely visited island of the South Shetlands, in Lat. 63° S., Long. 60° 30′ W., closely adjoining the Antarctic continent (Graham Land). Up to the present century it had been very little visited, and only two plants were known from it, an unnamed moss and a lichen.

The island is about 5 miles across, and the whole of the interior is formed by a vast crater, into which the sea has irrupted; this is hidden from view except at the one point where this inland sea is connected with the Antarctic Ocean by a narrow channel; the surroundling cliffs are high, steep and rugged, so that until carefully explored it has all the appearance of being a solid mountainous island, instead of being, as it really is, a mere shell of mountain wall surrounding the great sea-filled crater. Hence the name, Deception Island. A full and interesting, albeit somewhat weird account of the island is given by Foster in his narrative of the Voyage of H. M. Sloop *Chanticleer* (1828-30), from the Journal of the ship's surgeon W. H. B. Webster.

The whole island is nothing more or less than the cone of a gigantic volcano, and traces of activity still remain. The interior of the cliffs, some 1600 ft. high, are scored with small watercourses, arising from springs, the temperature of which is about 185° F., or even higher. A small lagoon is in one place almost cut off from the main interior basin, only communicating with it by a very narrow outlet; this lagoon is over 200 fathoms in depth, and is partly or entirely filled from the water flowing from the hot springs; its temperature must therefore be considerably above that of the main body of water, which itself is of a temperature slightly but appreciably above that of the surrounding ocean. We have therefore a condition of things probably unique in phyto-geography, viz., an absolutely isolated area, partly aquatic and partly terrestrial, capable of supporting many of the lower forms of life, but one which has been separated from any adjoining regions for what must have been, even geologically, a long period, since the whole of the surrounding area is constantly under perhaps the most severely frigid conditions existing anywhere on the surface of the earth. It seems eminently desirable that the fauna and flora of this remarkable biological preserve should be studied as exhaustively as possible.

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The Island was visited by the "Pourquoi pas," under Charcot, in the French Antarctic Expedition of 1908–10, and a certain amount of biological examination made. That this was not exhaustive, at any rate in certain directions, is, however, clear from the fact that the two biologists attached to the Expedition, MM. Gain and Gourdon, collected only two mosses, viz., *Grimmia antarctici* Card., and *Philonotis Gourdoni* Card. sp. nov., while the present collection, made by a non-botanist, and only a small portion of which has been examined, consists of eight species.

The collection was sent to me by Rev. D. Lillie, who has had numerous collections of mosses sent him from the Southern parts of S. America, by Mr. J. Hamilton. Mr. Hamilton engaged the interest of a friend of his, Mr. James Robins, who was being sent to Deception Island during the war to carry out a piece of naval work, and Mr. Robins collected what mosses he could during his stay there. Mr. Robins gives a graphic description of the surroundings, "hot water and mud spouting out of the ground, and only a few feet away eternal ice" . . . "thirty yards away from the salt water there is a lagoon about 500 yards in diameter, and we sounded this and got no bottom at 200 fathoms. This is warm water, and above this there is a mountain about 1,500 ft. high which has no ice, and it was here in the warmth and shelter I found the green piece of moss."

Mr. Hamilton forwarded the bulk of the moss collected to Mr. Lillie, but he reckoned without his submarines and the packet never arrived! Fortunately he had retained some small portions, and these being sent on later met with a happier fate and arrived safely. I found among them eight species, one being new to science, and I now give the list of these:

*Didymodon gelidus* Card. No. 447. I have seen no specimen of this species, which has only been recorded from its original station on the Antarctic continent (Card. in Nation. Antarct. Exped., Musci., p. 4). The present plant differs from the description and figures in one, and I think only one respect, in that the leaves are here all obtuse, in varying degrees, while in that they are "acuta obtusulave," The single difference, slight also as it is, cannot I think be held to outweigh the agreement on all other points.

*Tortula grossiretis* Card. forma aut var.?. No. 448.

I name this with some hesitation; it is a weak, soft, somewhat succulent plant, with fragile leaves, having plane margins, cells 13–18 $\mu$. wide, obscure, highly papillose, with the upper margin often somewhat erose. The nerve is rather weaker than in *T. grossiretis* from S. America, but that is in accord with the generally weak state of the plant, some leaves agreeing exactly with the normal plant. On the other hand the cells are not quite so large as in *T. grossiretis*, which moreover has the margins normally recurved. I suspect that the plant recorded by Cardot with some slight doubt, as *T. monoica* Card., from Graham Land (Fl. Bryol. des Terres Magellaniques, &c., p. 270) may be the same thing. Both plants were sterile.

*Grimmia antarctici* Card. No. 450. Only some small tufts, but in nice fruit. It agrees well with specimens of this species sent me by Cardot from Deception I. itself.

*Bryum algens* Card. Two of the numbers, 449 and 453, no doubt belong here, the former being a starved form. Both were sterile.

**Bryum crateris** Dixon sp. nov.

§Inclinatiformia. *B. imperfecto* Card. antarctico paullo, nec arcte affine. Dense caespitosum, laete viride, vix nitidum, infra fuscum., circa 2cm. altum, gracile. Folia caulina saepius comata, innovationum autem magis aequaliter inserta; sicca erecta, adpressa, nullo modo contorta; comalia 2–2.5 mm. longa, *ovato-lanceolata*, sensim acuminata, marginibus valde recurvis, *integerrimis*, anguste haud distincte limbatis. Costa sat valida, saepe rubella, in cuspidem validiusculum acutum integrum excurrens. Areolatio leptodermica, e cellulis inanibus, pellucidis, hexagono-rhomboideis, circa 60 μ. longis 12–15 μ. latis, instructa.

Synoicum; antheridia, ut videtur, pauca. Theca *vix exserta*. Seta perbrevis, circa 1 cm. longa, *supra flexuosa, saepe cygneo-decurva*, tenuis. Theca circa 3 mm. longa, e collo bene distincto turgide pyriformis, pallide fusco-straminea; operculum conico-apiculatum. Exothecii rete valde leptodermicum, e cellulis irregulariter hexagono-rectangularibus, orificium versus parum minoribus instructum. Spori 18–28 μ, saturate virides. Peristomium variabile; externi dentes aurantiaci vel pallidi, inter se remotiusculi, inferne anguste hyaline marginati tenuissime striolati, striolis nunc horizontaliter, nunc longitudinaliter, nunc oblique ordinatis; linea media irregularis, lamellae *remotae, paucae, tenerae*. lamellae internae *circa 10–12*, valde prominentes; dentium apices hyalinae, laeves. Peristomium internum e membrana pallida *humili* processubus dentibus aequilongis plerumque *tenuissimis* per totam longitudinem fere *valde fenestratis*. Cilia nulla.

Nos. 451; 452; the latter sterile..

Species propria, *B. imperfecto* Card. forsan affine, sed foliis multo angustioribus, atque structura peristomii longe aliena

The processes vary considerably, being usually extremely delicate and filiform; at times they are rimose to the base.

*Polytrichum alpinum* L. Nos. 455, 456. Sterile.

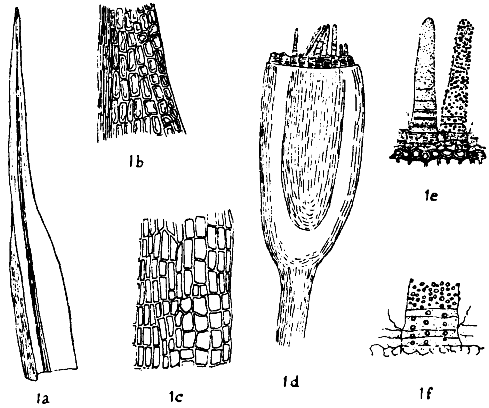
*Polytrichum subpiliferum* Card. No. 454.

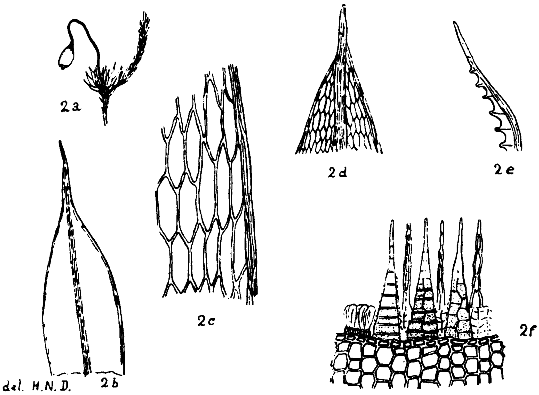
Fragments only found, hence not showing the white tomentum at base of stems but it agrees in other respects. The short hair-point, reddish below, white above, and the smooth back of the leaf, are the principal characters separating it from *P. piliferum*.

*Brachythecium Skottsbergii* Card. No. 446. This seems undoubtedly to agree with the description and figures. *B. antarcticum* var. *cavifolium* Card. differs in the more concave, less plicate leaves, and wider acumen, but the two must be very near one another.

## Mosses from South Georgia

The following list of mosses is drawn up from a collection sent me by Rev. D. Lillie also received by him from Mr. J. Hamilton, in 1919. The name of the





Verrucidens intermedius Dixon. Fig. 1 (1a-1f).
Bryum crateris Dixon. Fig. 2 (2a-2f).

collector is not given. Although the collection consists of less than 20 numbers, it contains two new species, one of especial interest.

Cardot enumerates 93 species for this group of islands, of which 42, or about 45%, are considered to be endemic.

**Andreaea subremotifolia** Dixon sp. nov.

Caespites laxi, facile dilabiles, caules 3–4 cm. alti, pergraciles, debiles. Planta *mollis* supra fusco-purpurea, interne fusca. Folia caulina *invicem laxe conferteque* ordinata, hic illic ramulis flagellaceis parvifoliis intermixtis.

Folia eis *A. remotifoliae* similia, *suberecta autem nec late patentia*, apice saepe incurvo, cellulis, *nullo modo fortiter incrassatis*, basilaribus *brevibus*, perpaucae solum juxtacostales infimae breviter lineares, marginales inferiores seriebus multis subquadratae. Cetera ignota.

No. 544. This is certainly nearest to *A. remotifolia* Dus., but equally certainly is distinct both in habit and structure. *A. remotifolia* has the leaves lax and widely spreading both moist and dry, the upper cells are highly incrassate, and the basal ones also incrassate and considerably elongate. The cells here are of quite a different character.

*Ceratodon grossiretis* Card. Nos. 534; 536; 537. All sterile. The cells are not quite so large as in the original plant, which has only been found on the Antarctic continent; they are there 15–20 µ. wide, while here they measure 12–17 µ; but the difference is slight, and certainly the plant is nearer to that than to any of the common forms of *C. purpureus* in the Antarctic region.

**Verrucidens intermedius** Dixon sp. nov.

*V. turpi* Card. affine, foliis autem siccis *haud crispatis*, vix mutatis, cellulis superioribus *haud transverse dilatatis, laevibus;* theca *bene exserta, seta unica* 3 mm., theca 1 mm. longa. Exothecii rete e cellulis valde incrassatis instructum; peristomii dentes 150 µ. longi, subobtusi, inferne flavidi vel aurantiaci, superne pallidi; *lamellae haud incrassatae, nec validae*, paucae; dentes dorso dense papillosi, papillis, praecipue inferioribus, grossis, verruculosis, saepe *in seriebus verticalibus* ordinatis, interne dense *tenuius* papillosi.

No. 532.

The genus *Verrucidens* was founded by Cardot in 1905 on *V. turpis*, a Fuegian plant with habit of *Blindia*, but peristome distinct in having the lamellae extremely thickened, and the whole inner surface, and the upper part of the outer surface covered with dense, coarse papillae. The seta is variable in length, from 5 to 12 mm., the upper leaf cells somewhat obscure with papillae. A year or two later, Brotherus described a second species from Kerguelen, at first published as *Dicranoweisia*, but recognized by Cardot as a species of *Verrucidens*. This differed entirely from *V. turpis* in having the capsule quite immersed, whence the name (*V. immersus*), as well as in the leaf cells quite smooth. The present plant appears to me to belong to this genus, by reason of the general structure of the peristome teeth, which show the coarse tubercular papillae characteristic of *Verrucidens;* it differs however in not having the lamellae thickened and prominent as there, on the dorsal surface, the papillae on the other hand being continued to the base, and there frequently arranged rather remarkably in three or four vertical series; while the papillae of the internal surface, while very dense are not coarse, but rather fine. The structure is therefore by no means identical; and moreover the leaves are not crisped when dry as in the other two species, though resembling those of *V. immersus* in all other respects, so far as can be judged from the figures and description. There is therefore some little doubt as to the generic position; unfortunately only a single capsule was present, and that in a worn condition, so that it is possible that a more perfect peristome might show characters conceivably more closely identical with *Verrucidens* than those exhibited by the present specimen.

*Blindia Skottsbergii* Card. f. *robusta* Card. No. 527.

I had considerable difficulty in determining this plant which resembled none of the South Georgian species except *B. Skottsbergii*, and that is a much smaller plant, with shorter leaves. The present plant rather closely approached *Dicranum aciphyllum* H. f. & W. in appearance, but the nerve section differed. A comparison of Cardot's description of the f. *robusta* of *B. Skottsbergii*, (Fl. bryol. des terres Magellan., &c., p. 266), and especially his note on this form under *Dicranum Nordenskjoldii* Card. however, cleared up the difficulty, and left no doubt that this was the solution of the problem. This form has been recorded only from the Antarctic Continent.

*Dicranum austro-georgicum* C. M. No. 530. A fine species, which has by some means been omitted by Brotherus in the "Musci."

*Tortula robusta* Hook & Grev. No. 529.

*Tortula lepto-syntrichia* (C. M.) Broth. No. 533.

*Rhacomitrium lanuginosum* (Hedw.) Brid. No. 538.

*Conostomum australe* Sw. Nos. 531, 541, The latter in fruit.

*Bartramia patens* Brid. Nos. 528, 540, 542. All c. fr.

*Bartramia diminutiva* C. M. No. 535. I judge this to be C. Mueller's plant from the small size and the subula toothed but hardly papillose. It can hardly be more than a segregate of *B. patens*.

*Psilopilum antarcticum* (C. M.) Par. No. 539.

*Brachythecium subpilosum* (H. f. & W.) Jaeg. Cum setis.

The male flowers are large, turgid, with numerous rather large antheridia. Seta stout.

17 ST. MATTHEW'S PARADE, NORTHAMPTON, ENGLAND.

## EXPLANATION OF PLATE IV

Fig. 1. *Verrucidens intermedius* Dixon.
1a. Leaf × 25.
1b. Cells at shoulder, × 150.
1c. Basal cells, × 150.
1d. Capsule, × 25.
1e. Peristome teeth; left, dorsal face; right, ventral do. × 100.
1f. Peristome tooth, lower part, ventral face, × 200.
Fig. 2. *Bryum crateris* Dixon.
2a. Stem, × 2.

2b. Leaf, X 15.
2c. Upper cells, X 125.
2d. Leaf apex, X 50.
2e. Peristome tooth in profile, X 100.
2f. Part of peristome, showing three teeth; median as seen by transmitted light; right, dorsal face; left, ventral face; X 75.

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## NOTES ON USEFUL AND HARMFUL MOSSES

### T. C. FRYE

In general mosses are considered neither useful nor harmful, with the exception of Sphagnum, about whose usefulness we have heard much during the recent war. The facts concerning the effects of mosses upon man and his activities should however be recorded. Possibly this could be most successfully done in the form of short notes on observations and experience. In the hope that others may be encouraged to send such information to THE BRYOLOGIST the following is presented:

*Dicranoweisia cirrhata* is one of the first mosses to appear on shingle roofs in western Washington. North roofs are much more readily covered than south ones, on account of the retention of the moisture. Soot and dust are held and thus soon a sort of soil is accumulated. In shade, a new roof may be covered with moss within 10 years. Washington shingles are made of cedar (*Thuja*), which strongly resists fungi and bacteria; but the dampness held by the moss and soil very greatly increases decomposition. The remedy is to creosote the roof every few years.

*Ceratodon purpureus* appears in the tufts of *Dicranoweisia cirrhata* on Washington roofs, but it does not take hold first on a new roof, so far as I know.

*Rhacomitrium canescens ericoides* sometimes takes all the other mosses on a north roof, and seems to find it one of its best habitats for the production of capsules. This was observed on quite old roofs at Friday Harbor, Washington.

*Bryum argenteum* was observed to be the chief moss on an old north shingle roof near Aberdeen, Mississippi. The shingles were cypress. This causes one to wonder whether the kind of wood of which the shingles are made has anything to do with the species of moss which grows on the roof.

*Neckera Menziesii* is used occasionally by Japanese market gardeners in the vicinity of Seattle, Washington, as a packing for asparagus and lettuce, to retain moisture. It is so far inferior to sphagnum for this purpose than it is questionable whether this is not done through ignorance.

*Brachythecium albicans* takes the grass in lawns in western Washington when the dampness is excessive, usually through over-watering. Shade increases the dampness and thus favors the moss. The remedy is to water less, or to scatter lime, or both.

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